

# INDEX TO THE THIRTY-SECOND VOLUME

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## MINERAL TRAFFIC ON RAILWAYS.

In a recent number of the *Mining Journal* the movement of minerals, and the receipts derived from them, on every English railway were examined in pains-taking detail. Want of space, however, prevented our going into corresponding particulars with regard to the English and Scotch lines, to which we now proceed to direct attention. To take SCOTLAND first, the Banff, Portsoy, and Strathisla Railway carried in 1861 1614 tons of coal and coke, and 1429 tons of other minerals, producing 3557. (2377. for coal and coke); the Caledonian, which did not classify details, carried 3,506,672 tons of minerals generally, producing 279,2637; the Caledonian and Dumbartonshire Junction carried 78,727 tons of coal and coke, and 24,486 tons of other minerals, producing 40341. (32937. for coal and coke); the Crieft Junction carried 11,357 tons of coal and coke, and 2271 tons of other minerals, producing 38004. (27544. for coal and coke); the Deeside carried 15,679 tons of coal and coke, and 11,469 tons of other minerals, producing 30837. (19867. for coal and coke); the Dundee and Arbroath carried 50,282 tons of coal, and 35,480 tons of other minerals, producing 38797. (20877. for coal and coke); the Dundee and Perth and Aberdeen Junction carried 51,242 tons of coal and coke, and 45,981 tons of other minerals, producing 63667. (33007. for coal and coke); the Edinburgh and Glasgow, which did not classify details, carried 1,341,514 tons of minerals generally, producing 66,4357. (this statement includes the mineral movement on the Edinburgh and Bathgate, the Stirling and Dunfermline, and the Glasgow, Dumbarton, and Helensburgh); the Edinburgh, Perth, and Dundee, which did not classify details, carried 513,756 tons of minerals generally, producing 52,9147. (this statement includes the mineral movement on the Kinross-shire, the St. Andrew's, and the Leslie); the Fife and Kinross carried 11,411 tons of coal and coke, and 867 tons of other minerals, producing 7477. (6727. for coal and coke); the Firth of Forth carried 3944 tons of coal and coke, and 161 tons of other minerals, producing 1377. (1327. for coal and coke); the Forth and Clyde Junction carried 28,445 tons of coal and coke, and 35,491 tons of other minerals, producing 47977. (31077. for coal and coke); the Forth and Clyde Navigation, as owners of the Drumpeller Railway, which is not a passenger line, carried 298,339 tons of coal, producing 31107. the General Terminus and Glasgow Harbour Railway, which is also not a passenger line, carried 181,804 tons of coal and coke, and 29,761 tons of other minerals, producing 50337. (45307. for coal and coke); the Glasgow and South-Western, which did not classify details, carried 2,475,326 tons of minerals generally, producing 185,3187. (this statement includes the mineral movement on the Kilmarnock and Troon Railway, the Castle Douglas and Dumfries Railway, the Ayr and Maybole, and the Maybole and Girvan Railway); the Great North of Scotland carried 60,028 tons of coal and coke, and 54,227 tons of other minerals, producing 12,0867. (74917. for coal and coke); this statement includes the mineral movement on the Inverary and Old Meldrum Junction, the Alford Valley, the Aberdeen and Turfiff, the Banff, Macduff, and Turfiff Extension, and the Formartine and Buchan); the Inverness and Aberdeen Junction carried 11,534 tons of coal and coke, and 25,299 tons of other minerals, producing 36187. (10427. for coal and coke); the Leven and East of Fife carried 12,585 tons of coal and coke, and 1083 tons of other minerals, producing 8607. (7797. for coal and coke); the Monkland carried 1,050,868 tons of coal and coke, and 552,501 tons of other minerals, producing 72,9357. (41,7697. for coal and coke); the Morayshire carried 14,888 tons of coal and coke, and 13,894 tons of other minerals, producing 20267. (10867. for coal and coke); the North British carried 319,338 tons of coal and coke, and 58,534 tons of other minerals, producing 49,7167. (42,0607. for coal and coke); this statement includes the mineral movement on the Peebles and Border Union); the Perth, Almond Valley, and Methven Junction carried 6009 tons of coal and coke, and 4140 tons of other minerals, producing 6597. (4167. for coal and coke); the Port Patrick carried 4837 tons of coal and coke, and 13,969 tons of other minerals, producing 11027. (3887. for coal and coke); the Scottish Central, which did not classify details, carried 340,765 tons of minerals generally, producing 34,0017. (this statement includes the mineral movement on the Dunblane, Doune, and Callander); the Scottish North-Eastern carried 182,428 tons of coal and coke, and 62,378 tons of other minerals, producing 31,6097. (23,9887. for coal and coke); this statement includes the mineral movement on the Arbroath and Forfar, the Perth and Dundee, and the Ayr and Maybole; and the West of Fife, which is not a passenger line, carried 198,603 tons of coal and coke, and 21,243 tons of other minerals, producing 10,0307. (90407. for coal and coke); this statement includes the mineral movement on the West of Fife and Charleston section). The total quantity of minerals carried in 1861 on the Scottish lines was consequently 11,766,609 tons, producing 837,9137.

In IRELAND, which next invites attention, the mineral traffic of the railways is at present developed on a very limited scale—in fact, this branch of business can be scarcely said to exist at all. The Belfast and Northern Counties Railway carried in 1861 20,536 tons of coal and coke, and 18,803 tons of other minerals, receiving for the service 56737. (47697. for coal and coke); the Belfast and County Down carried 9722 tons of coal and coke, and 9700 tons of other minerals, receiving for the service 16647. (8727. for coal and coke); the Cork and Youghal carried 887 tons of coal and coke, receiving for the service 397. the Dublin, Wicklow, and Wexford carried 1410 tons of coal and coke, receiving for the service 1007. the Great Southern and Western carried 58,196 tons of coal and coke, receiving for the service 11,1937. the Midland Great Western carried 19,172 tons of coal and coke, receiving for the service 44867. the Newry and Armagh carried 12,052 tons of coal and coke, and 1464 tons of other minerals, receiving for the service 6737. (6007. for coal and coke); the Ulster carried 25,988 tons of coal and coke, receiving for the service 42537. and the Waterford and Limerick carried 33,144 tons of coal and coke, receiving for the service 50257. The total quantity of minerals conveyed over Irish lines in 1861 was, consequently, 220,084 tons, producing 33,1067. to the companies employed. It should be observed that the statement for the Belfast and Northern Counties includes the mineral movement on the Londonderry and Coleraine; that for the Great Southern and Western, the mineral movement on the Killarney Junction, the Tralee and Killarney, the Irish South-Eastern, and the Bagenalstown and Wexford; that for the Midland Great Western, the mineral movement on the Great Northern and Western and the Athenry and Tuam; that for the Ulster, the mineral movement on the Portadown, Dungannon, and Omagh Junction; and that for the Waterford and Limerick, the mineral movement on the Waterford and Kilkenny, the Limerick and Foyne, the Limerick and Castle Connell, and the Limerick and Ennis.

To recapitulate. It is interesting to note the growth of the mineral traffic of the railways of the United Kingdom in 1861, as compared with 1860. This may be seen at a glance in the following figures:—

	1861.	1860.	Increase.
England and Wales.....Tons	51,617,741	49,704,189	1,913,552
Scotland	11,766,609	10,496,476	1,270,133
Ireland	220,084	192,129	27,955
Total	63,604,434	60,392,794	3,211,640

The increase in the receipts from this source was also considerable. Thus the amounts respectively acquired were:—

	1861.	1860.	Increase.
England and Wales.....£	4,323,174	4,185,500	£137,674
Scotland	837,913	768,808	69,105
Ireland	33,106	27,791	5,315
Total	£4,894,193	£4,981,109	£63,084

It is important to observe that the systems which had the largest mineral traffic generally paid the best dividends in 1861. Thus, the North-Eastern, which derived 525,6257. in 1861 from the carriage of minerals, paid 5½ per cent. on its 7,268,6587. of ordinary Berwick stock, 4½ per cent. on its 3,219,0207. of ordinary York stock, and a fraction above 2½ per cent. on its 1,393,8727. of ordinary Leeds stock; the London and North-Western, which derived 616,5757. last year from the carriage of minerals, paid 4½ per cent. on its 25,224,3407. of ordinary stock; the Midland, which derived 500,0007. from the carriage of minerals, paid 6½ per cent. on its 9,714,0197. of ordinary stock; the Lancashire and Yorkshire, which derived 184,3777. from the carriage of minerals, paid 5½ per cent. on its 12,093,5947. of ordinary stock; the Caledonian, which derived 279,2637. from the carriage of minerals, paid 5½ per cent. on its 3,289,4327. of ordinary stock; the Great Northern, which derived 307,7757. from the carriage of minerals, paid 5½ per cent. on its 4,796,7377. of ordinary stock; while the Great Western, which derived 190,1067. from the carriage of minerals, out of a total receipt of 2,149,0967., only paid 2½ per cent. on its 8,173,4877. of ordinary stock; and the Eastern Counties—now the Great Eastern—which derived 112,7217. from the carriage of minerals, only paid a fraction above 2½ per cent. on its own 5,833,6707. of ordinary stock, nothing on the 1,033,6067. of East Anglian ordinary stock, 5 per cent. on the 996,6907.

of Norfolk ordinary stock, and about 2½ per cent. on the 1,109,1917. of Eastern Union ordinary stock.

One word more. The twelve great systems of the empire ranked as follows in 1861 as regards the quantities of minerals carried on them:—

System.	Quantities.	Receipts.
1.—North-Eastern.....Tons	5,579,524	£226,625
2.—London and North-Western.....	5,581,326	616,575
3.—Midland.....	4,129,910	500,000
4.—Caledonian.....	5,506,672	279,263
5.—Lancashire and Yorkshire.....	2,655,498	184,377
6.—Great Western.....	2,441,118	190,106
7.—Great Northern.....	1,498,654	307,775
8.—Great Eastern.....	769,986	112,721
9.—Manchester, Sheffield, &c.....	611,261	73,182
10.—London and South-Western.....	391,905	42,619
11.—London, Brighton, &c.....	287,998	28,653
12.—South-Eastern.....	161,169	28,567

The North-Eastern, a system which has gradually struggled into a foremost place, must, consequently, be regarded as the leading mineral artery of the empire; and as it has this year absorbed the Newcastle and Carlisle—which in 1861 carried 627,877 tons of minerals, producing 68,8507.—it will, probably, continue to maintain its position, even if it should not succeed in effecting the amalgamation now proposed with the Stockton and Darlington, which in 1861 carried 3,706,144 tons, producing 294,3487. The Manchester, Sheffield, and Lincolnshire Railway stands rather low down in the list, but it should be observed that the South Yorkshire—which in 1861 carried 1,016,639 tons of minerals, producing 81,4487.—is now worked in connection with it. The twelve systems recapitulated above are selected from the magnitude of their capital accounts; but the mineral traffic of the last four or five is exceeded by that on the Glasgow and South-Western, the Edinburgh and Glasgow, the Monkland, and several other lines which have been previously noticed. It may excite some surprise that the Great Northern does not occupy a higher position in regard to the quantity of minerals carried; but it will be seen that its traffic under that head is of a more through character than the corresponding business enjoyed by any other system.

## MINING PHOTOGRAPHS—No. VII.

"CALLS."—"A wise king before he builds a tower first sits down and reckons the cost." So said, and thus taught, the sage in Proverbs of yore. These ancient but wise sayings were intended for, and will extend to, all time. Well, indeed, would it be if at this distant period the one we quote were acted on in spirit and in truth! Let us ponder and consider what would be the effect on mining speculations were this particular axiom but extensively or universally practised? Everybody, we opine, will admit its admirable adaptation to the subject.

Were but a wise adventurer to sit down first and reckon the cost, there would be few, very few, wild, reckless, speculations, now so numerous; still fewer "mine sales," as referred to in our last essay. We do not allude to or mean "sales of mines," which are quite and wholly different matters. We are verily and firmly persuaded in our own minds there would be infinitely more and far safer investments in such like properties as at home than are now encouraged, and proportionably fewer foreign undertakings, at present so sedulously and extensively supported, so widely and unblushingly paraded, so expensively advertised—perhaps, therefore, so elaborately and laboriously lauded by the public press. When looking over the Money and City articles of the majority of the "dailies"—not omitting the great Thunder itself—how rarely do we see the notice of a humble prospectus of a deserving property modestly inviting the outlay of a few thousands, the expenditure and locality of such investments being under the eye, ken, and care of the subscribers? How frequently—aye, indeed, how frequently—at the present day, scarcely do we take a "daily" into our hands but the prospectus of some foreign speculation is distinctly alluded to, or invitingly mentioned and praised as being favourites on 'Change, the which require capitals of scores of thousands each, to be drained from the pockets of John Bull, for the development of previously unheard of, unknown American properties, worn-out Brazilian, Mexican, or Spanish El Dorados, marvelously neglected, and bequeathed in some guise to a beggarly count or senator, who, by the purchase money of the freehold or valuable mine, hopes to redeem, or rather found, a fortune? It should be remembered gold itself, if it really exist, may be bought too dearly; that, after all, before even gold can be made remunerative, an outlay must be incurred. How many have rushed wildly into schemes—repeat schemes—who never for a single moment thought of first sitting down and reckoning the cost? Deluded by the glittering bait, like silly gudgeon or rapacious trout, they rush headlong to what to them appears the golden prize; or, we should rather say, in truth, bait. When too late they feel the undreamed of hidden barb. The advice and caution tendered with ever so good intentions, or with most sincere anxiety, is seldom heeded—far oftener it is spurned. Overweening assurance in their own discernment and consummate shrewdness, too frequently mistaken for, but far different from, well-grounded self-reliance, urges them on, until they fall, willing or unwilling, victims of their own folly. Were such to "read, mark, learn, and inwardly digest" the subject of our motto, they would save themselves much discomfort, as well as severe but useless reflections, and British mining industries many undeserved calamities and unworthy misrepresentations.

"Calls, calls, calls!" we have heard the sound so often that the very echo rings in our ears—"Calls, calls!" the very word unstrings our nerves, sets our teeth on edge and our mind on the rack. At the bare mention of the subject we are seized with the horrors, and our heart quails—we drop our pen until we resume our equanimity. We resolve by at once opposing a sea of troubles to end them; in our philosophical mood we determine thus, and are prepared thus to act in indignant disgust, until Reason resumes her seat, and asks the question—"Did you first sit down and reckon the cost?"

If our thesis were brought into action at the proper time for consideration, the obnoxious monosyllable would be wholly or partially avoided. At present, must is the only simple reply to the appeal for procrastination—"Can't you, won't you, call again to-morrow," accompanied by jocular railery—"Yes, and the day after, too; but we must have this call paid first; we shall have calls enough, and fast enough." Any determination to withstand the sea of troubles only increases the evils they were intended to prevent. It may be argued, and in justice we are obliged to admit the plea, that all speculations are more or less liable to these so-called annoyances. This principle is the very basis of our argument. If all, before they attempt to build a tower, or embark in an extensive undertaking, first sit down and reckon the cost, how many exhibitions of furious indignation at imaginary or real evils; how many anathemas at innocent employees; how many sulky, gloomy, miserable hours of home discomfort would by these simple means be prevented! To the proverb already so largely dwelt on let the law term (we can hardly dignify it with the title of proverb) caveat emptor be added. Also, consider well whence the project to be entertained emanates; where the subject of it is situated; with whom associated; the probable results, calculated from a business-like point of view, but above all the cost. This done, little fear need be entertained for British mining interests.

"Calls, calls!" the dread of which the power of our photograph fails adequately to display, though we do our best, and which evil too frequently and sadly spreads dismay most fearfully, should by all means be avoided. Comparative immunity may be enjoyed by adopting the before-given advice; to which we would, however, add further,—the life, essence, meaning, and hope of our essay—the real animus which dictates our language, the power that guides our pen—let no one embark in mining speculations until he has first well reckoned whether he can spare the cost, that cost to be carefully considered and calculated, to let nothing but the fair and unavoidable risks of legitimate mining interfere with regard to the amount to be invested, and to trust nothing to the chapter of accidents or gambling propensities. The Limited Liability Act affords great and most valuable advantages, if they be adopted in the spirit in which they were conceived and dictated. These are far more available to home transactions than to foreign schemes, be they ever so plausible; such as in countries in which revolution, civil war, and anarchy reign, or are prevalent, and where English capital, even if fraudulently obtained, meets with little, tardy, or no redress. By adopting our advice, or acting on that of the wise king, mining prosperity will be encouraged, home industry fostered, the public well cherished, the national advantages of our island home developed, happy hearths created; the most timid may speculate in perfect security, and snap their fingers at the frightful, too often really dreadful word, "calls."

It may by some (but they must be novitiates) said this is no mining photograph. We say that it is, and a real one too. Though it may be a negative, it is one from which many positive copies may, and we hope

will, be printed and treasured. Hundreds will recognise the truth of our remarks, and will, we feel confident, whilst smiling at our endeavours, inwardly exclaim—"Both the 'calls' can't you, won't you, call again to-morrow?"

GEORGE HENWOOD.

## ASSOCIATION FOR THE PREVENTION OF STEAM-BOILER EXPLOSIONS.

At the usual monthly meeting of the executive committee (Mr. William Fairbairn, C.E., F.R.S., in the chair), Mr. L. E. Fletcher presented his report, which states that:—

During the past month, ending Dec. 31, 1862, there have been examined 450 engines—3 specially; 621 boilers—12 specially, 9 internally, 54 thoroughly, and 546 externally. In which the following defects have been found:—Fracture, 4; corrosion, 53 (1 dangerous); safety-valves out of order, 13 (2 dangerous); water-gauges ditto, 24; pressure-gauges ditto, 9; feed-apparatus ditto, 1; blow-off cocks ditto, 32 (1 dangerous); furnaces out of shape, 7 (2 dangerous); blistered plates, 1.—Total, 124 (6 dangerous). Boilers without glass water-gauges, 6; without pressure-gauges, 16; without blow-off cocks, 27; without back pressure valves, 44. While I am happy to be able to report that no explosion has happened during the past month to any of the boilers under the inspection of this association, the occurrence of five explosions in other quarters during that period has come to my knowledge. Each of these has been attended with fatal consequences, 26 persons in all having been killed, and upwards of 52 injured. Two of the exploded boilers were personally examined. The first of these explosions, and from which 10 persons were killed and 26 injured, occurred at an ironworks. The boiler was a horizontal one, of plain Cornish type, with a single internal flue, and a longitudinal steam chamber fixed above the shell. It was heated, as is common in such works, by the flames passing off from the iron furnaces; the flames of one of these passed through the internal flue in one direction, and those from two others passed outside the shell in the other direction. These furnaces were placed immediately at the ends of the boiler, one at one end and two at the other. The cause of the explosion was attributed at the inquest to shortness of water, which leading to overheating of the plates had, it was supposed, on the re-introduction of the feed, resulted in a sudden and excessive pressure of steam. This was imputed to the carelessness of the engine-tender, and the jury found him guilty of manslaughter; in consequence of which he was committed to the next assizes for trial. There is good reason to question the correctness of the above conclusions, and to attribute the explosion to other causes than shortness of water, and the negligence of the engine-tender. Upon careful consideration of all the circumstances, to enumerate the whole of which would be tedious, there appears every reason to believe that the explosion resulted from the collapse of the flue tube consequent upon its inherent weakness, and not from shortness of water; while that collapse might have been prevented either by the introduction at the time of the construction of the boiler of flanged seams, or hoops of T iron, angle iron, or other approved form, or else by the addition to the flue, since it was made of single iron hoops.

The second explosion, which resulted in the loss of three lives, was of a much simpler character than the one just referred to, and occasioned scarcely any damage to property. The boiler was of plain double-flued internally-fired construction, such as is in general use at cotton-mills in Lancashire. Its length was 25 ft. 6 in.; the diameter of its shell 7 ft. 6 in.; and of its internal furnace tubes, 2 ft. 10 in.; the thickness of the plates in both being from ¾ to 7-16ths. The fittings were complete as to number, as well as satisfactory as to condition, and all that was necessary with due care for safe working. The working pressure was stated not to have exceeded 35 lbs., and there was no reason to doubt the correctness of this, while the boiler was perfectly capable of working safely at a much higher pressure, as long as it was in good condition. On examination, however, it was at once apparent that it had not exploded either from excessive pressure or shortness of water, but from thinning of the plates through external corrosion.

It is gratifying to find that the members now appreciate more fully than heretofore the importance of annual "thorough" examinations, and that the number has consequently increased from 434 in the year 1861, to 820 in the year 1862; thus, as it will be seen, having almost doubled this last year as compared with the previous one. Still, the privilege afforded by the association is an "internal and thorough" examination of every boiler once a year, so that the full number has not even yet been attained, and members will not derive that safety from the surface of the association which they might, until every boiler, without exception, is examined by its inspectors, both "internally and externally," every year. The introduction of "surface blowing-out," for the removal of incrustation—a difficulty most severely felt in this district both by inspectors and steam users—has during last year made considerable progress. There are three different kinds of steam-pipes now in use. One entirely free from patent right, and which may be made and applied by anyone, and was described in the Monthly Report for October (see *Mining Journal* of Nov. 1), and two others, both of which are patented, one being termed the "Needham," and the other the "Shepherd" steam-pipe.

A surface-condenser is being applied to a pair of cotton-mill engines, by which means a constant supply of distilled water for the boilers will be secured. This, in many situations, will prove most valuable, since water otherwise quite unfit for use will thus be rendered serviceable. Steam-jackets, so long discarded in this district, have been revived and fitted to the cylinders of some new engines lately laid down, while others are being added to a pair of beam engines already in use. A superheating apparatus has in two or three cases been applied for raising the temperature of the steam in its passage between the boiler and the engine. Each of these movements has an important bearing upon the economic use of steam in this district, and it is thought that information with regard to them will be highly valuable to the members of the association, and, therefore, the results of the working of the whole will be fully investigated and reported to them. The delay in completing the engines fitted with steam-jackets, consequent upon the depressed state of trade, has prevented their economy being tested during the past year; and with regard to the superheating apparatus, it was thought advisable that the examination should be deferred until the apparatus had been in full work for a longer period; but the economic result both of the use of the steam-jacket and of superheating steam will now be taken into consideration early this year. It may be added, that there lies at the office, for the inspection of the members, a drawing of the steam-pipe referred to, as well as the arrangement of feed apparatus found to be most convenient. Also a drawing of the method of adding strengthening hoops to flues of boilers when in position, from which, through the neglect of suitable precaution, many flues have been injured, and considerable expense incurred by our members. Also there is a drawing of the method of setting boilers found to be most approved with the best proportions of flues. The plans upon which many under inspection are set are most capricious, and defy all attempts to examine the plates.

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